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# (12) UK Patent Application (19) GB (11) 2 139 180 A

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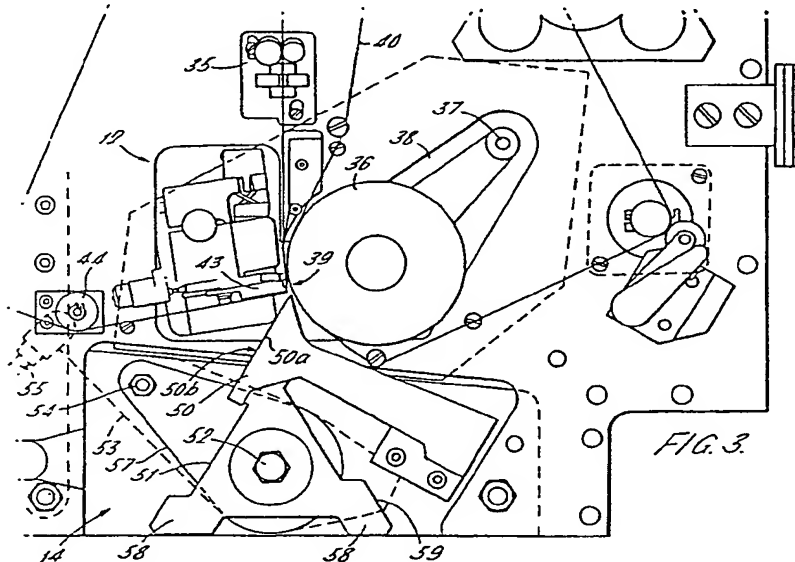
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(54) A label applying apparatus for applying self-adhesive labels to articles

(57) A labelling apparatus for a high price labelling machine includes a rotary drum 51 having a plurality of label holding applying parts 52 disposed around its periphery, which picks up each label from a gate 50 which comprises two spaced lips 50a, 50b, and turns and at the same time is moved linearly downwards to discharge the labels on to an article and is then moved upwards by a ram 56, Fig. 1) for collection of a further label by the gate. The ram has an adjuster 70, Fig. 1) to set the upper position of the drum with respect to the gate so that the pads can be centred with respect to the labels supplied to the gate according to the size of label.



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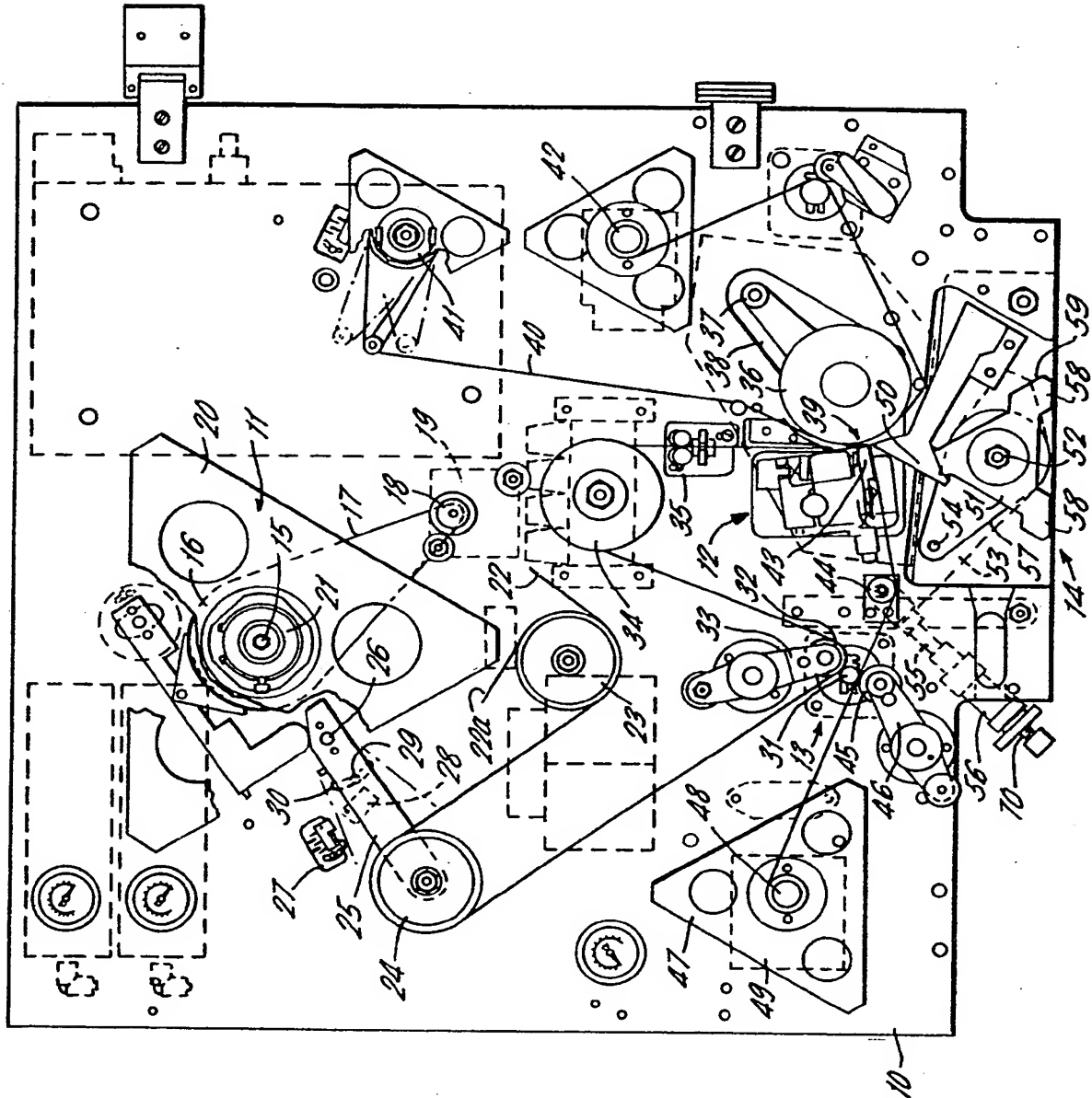
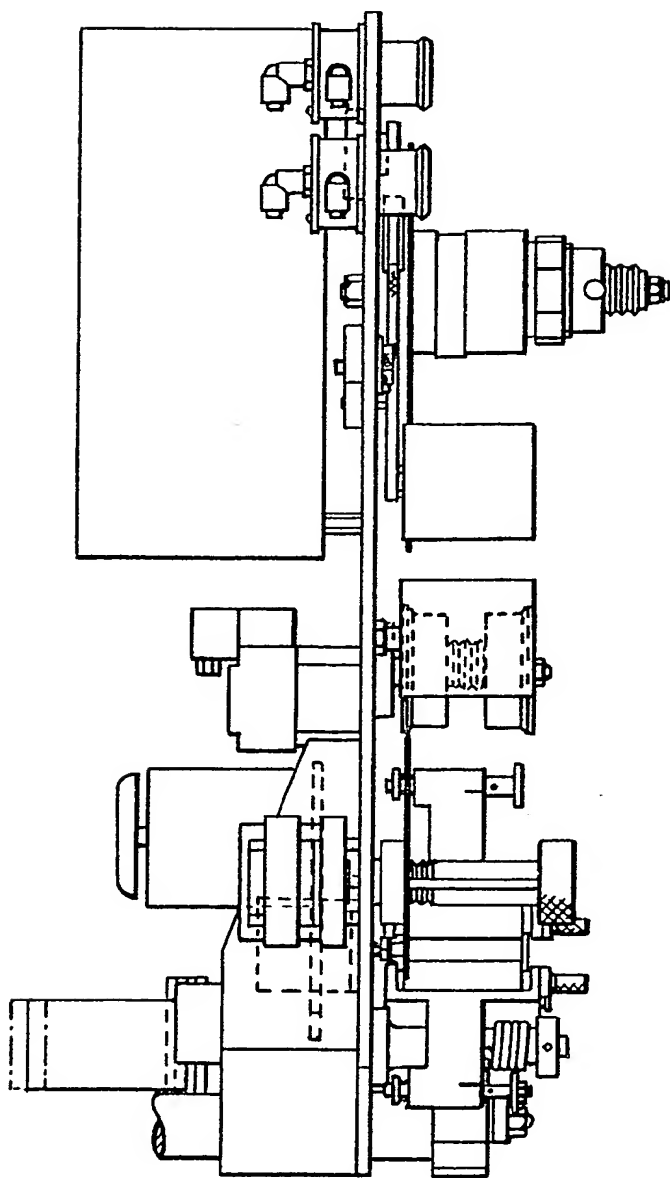


FIG. 1

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FIG. 2.



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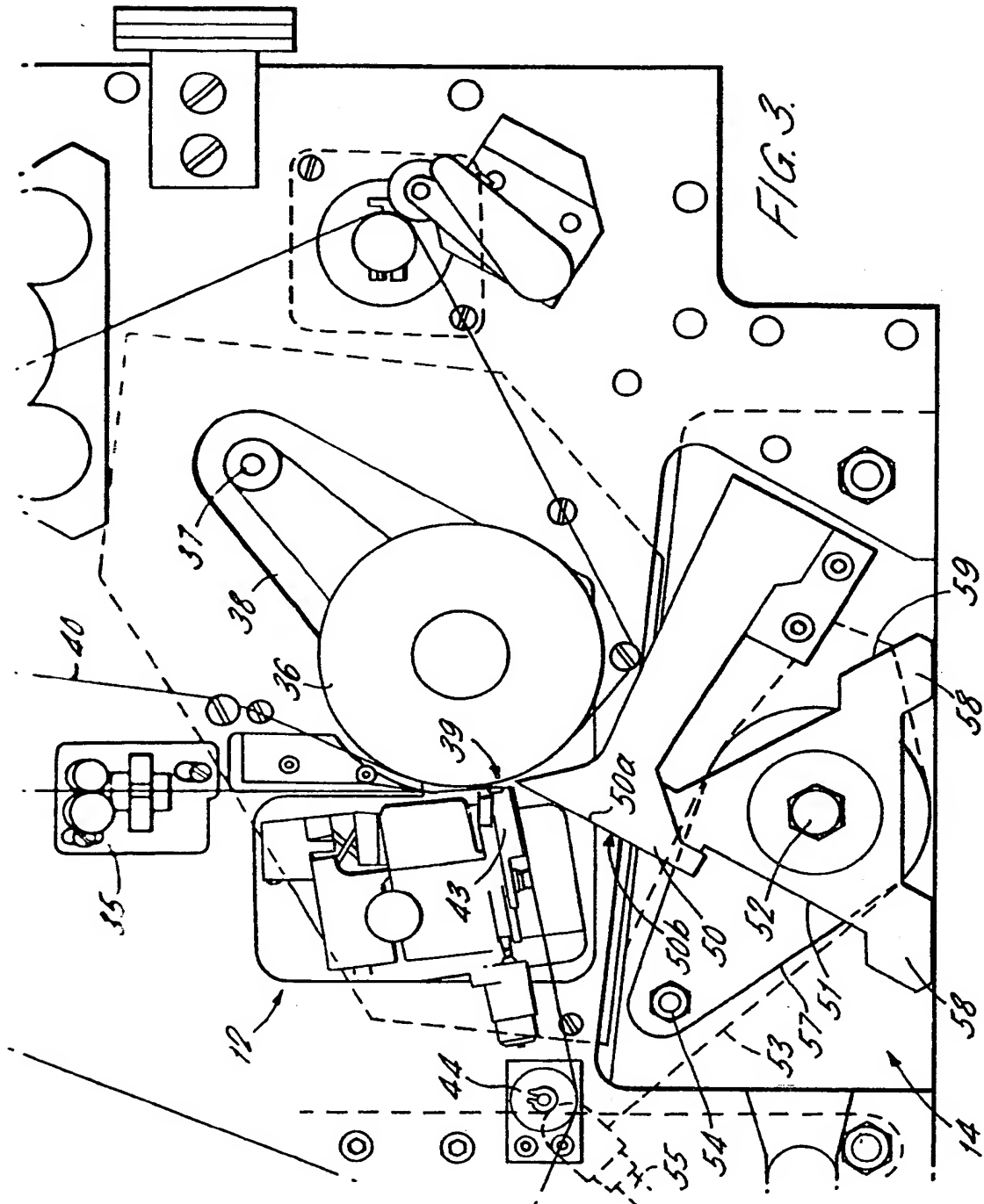


FIG. 4.

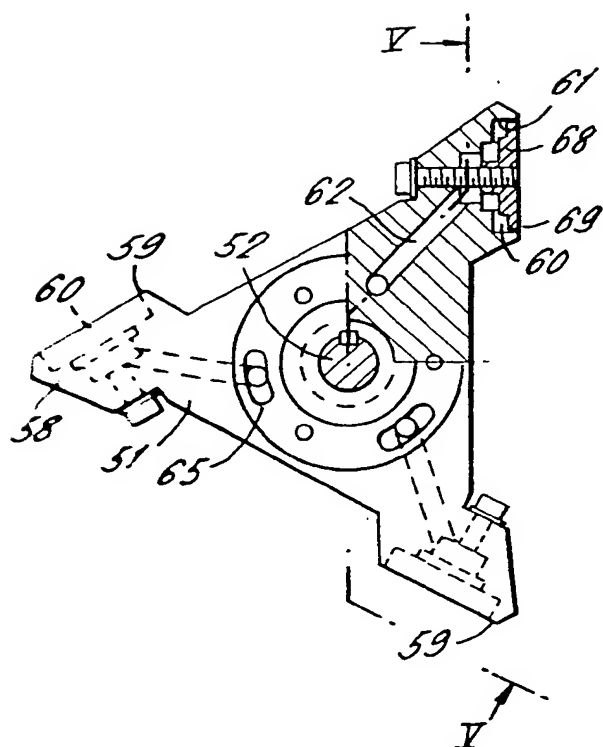


FIG. 5.

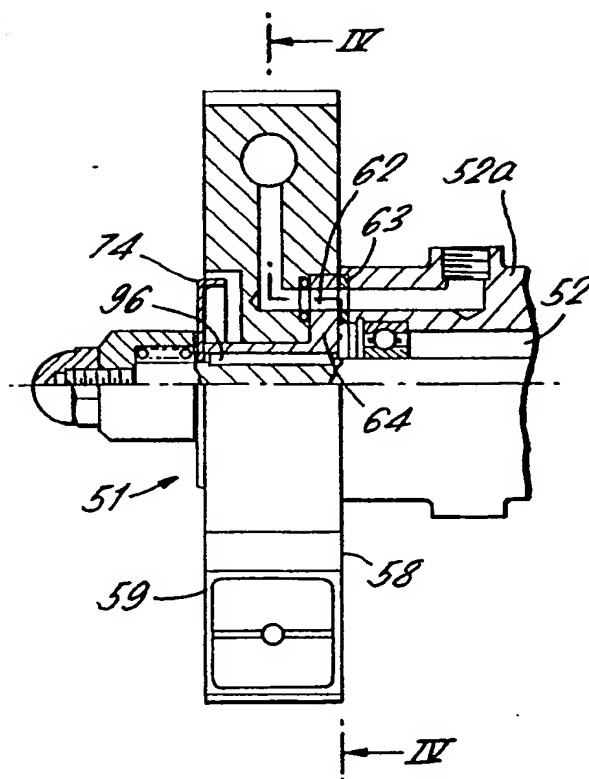
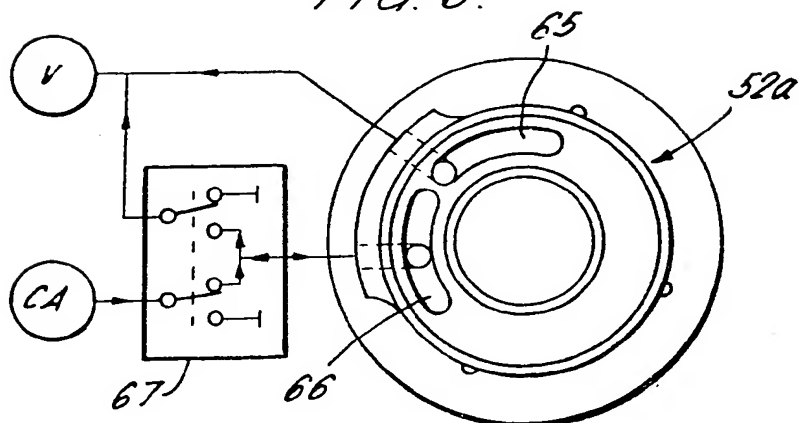


FIG. 6.



## SPECIFICATION

**Improvements in or relating to labelling apparatus for applying self-adhesive labels to articles**

5 This invention relates to labelling apparatus for applying self-adhesive labels to articles and in particular to apparatus for use in weigh/price labelling machines in which articles (such as good items) are conveyed to a weigh station and then to a labelling apparatus where a label printed in accordance with information received from the weigh station and including weight, price, date, description of the goods and appropriate bar codes is applied to the article.

The invention provides a labelling apparatus for applying self-adhesive labels to articles comprising a grid having a surface to receive labels, means to feed labels one after the other to the grid at one end of the grid, the grid comprising two spaced limbs each having ports at said surfaces of the grid to hold a label thereon, a rotary head disposed at the opposite end of the grid to said label feeding means, the rotary head having a plurality of label holding/ applying pads disposed around its periphery, mounting means for the rotary head to support the head for rotation of the pads on the head through the gate to collect labels therefrom and to discharge the labels on to articles at a station spaced from the gate and means to adjust the mounting for the rotary head in a direction generally parallel to the lengthwise direction of the gate to adjust the location at which the pads register in the gate so that the pads can be centred with respect to the labels supplied to the gate.

The following is a description of a specific embodiment of the invention, reference being made to the accompanying drawings in which:

Figure 1 is an elevation view of a label applying apparatus for use in a weigh/price labelling machine;

Figure 2 is an end view of the apparatus shown in Figure 1 and;

Figure 3 is a detailed view of part of the apparatus shown in Figure 1;

Figure 4 is a detailed view of part of the apparatus shown in Figure 3 sectioned as indicated by the line IV-IV in Figure 5;

Figure 5 is a sectioned view as indicated by the line V-V in Figure 4; and

Figure 6 is a view, looking in the opposite direction to Figure 4, of part of the apparatus shown in Figure 5.

The drawings illustrate a labelling apparatus for a weigh/price labelling machine in which a conveyor system transports articles to be weighed and priced to a weigh station where the weight of each article is measured and the article price computed from the weight and are then delivered to a labelling station where a label printed with the weight and price information computed for that article is applied to the article.

Referring now to the drawings, the label applying apparatus shown comprises an upright base 10 on which the following elements are mounted:

i) A device 11 for holding a reel of self-adhesive labels mounted on a backing;

ii) An apparatus 12 for printing weigh/price information on the labels on the backing and stripping the labels one by one from the backing;

iii) A feed device 13 for drawing the backing through the weigh/price/label stripping apparatus;

iv) A device 14 for receiving stripped labels one by one from the backing and applying the labels to the appropriate articles.

Referring now to Figure 1 of the drawings the holder 11 for a reel of label carrying strips comprises a spindle 15 mounted for rotation on the base and carrying a drive pulley 16 connected by a belt drive 17 to the output pulley 18 of a drive motor 19. The spindle 15 carries a large triangular shaped backing plate 20 and a hub assembly 21 to receive a reel of label supply strips. The strip indicated at 22 is fed around a roller 23 disposed below the holder 11. The reel of strip is located on the holder 11 to be drawn off clockwise if the labels are disposed on the outer side of the strip or anti-clock if the labels are disposed on the inner side of the strip (as indicated by the line of strip 22a) so that the labels are disposed on the outer side of the strip as they pass around the drum 23. The strip 22 then passes to a jockey roller 24 mounted on a swing arm 25 pivoted at 26 on the base, one micro-switch 27 is mounted in the upward path of movement of the arm 25 and a second micro-switch 28 is mounted in the downward path of movement to be engaged by a pin 29 on the arm moving in an arcuate slot 30 in the base which limits the total range of travel of the arm. The micro-switches 27 and 28 are arranged to control the motor 19, the switch 27 switching the motor off and the switch 28 switching the motor on so that the motor 19 maintains the supply of strip around the roller 24 as the arm floats in between the micro-switches. The strip 22 then passes through a motor driven drive roller 31 engaged by a pinch roller 32 mounted on a pivotal arm 33 biased against the drive roller by a spring (not shown). The strip then passes around an idle roller 34 through a photo-electric detector device 35 into the label printing mechanism 12. The label printing mechanism comprises a drum 36 on which there is embossed annular rows of type found the drum being driven by a drive motor 37. The strip 22 is arranged to pass adjacent the periphery of the drum at a printing station indicated at 39 with the label to be printed facing the drum periphery. An inking ribbon 40 is fed from a motor driven supply reel 41 between the periphery of the drum and the labels and thence to a motor driven take-up spool 42. On the opposite side of the label strip to the drum periphery of the printing station there is a set of solenoid controlled printing hammers which hit the label to be printed at the appropriate location in accordance with the rotational position of the drum 36 to print the required characters on the label. Typically the information printed on the label will comprise the goods, the price per unit weight of the goods, date of sale, the date by which the goods must be consumed, the particular weight of the goods, the price of the goods together with that information encoded in bar codes.



The strip then passes around a right-angled stripper block 43 which causes the printed label to detach from the strip and move on to a label applying device which will be described below. The backing  
5 then passes around guide roller 44 to the underside of the drive roller 31 where it is held against the roller by a pinch roller 45 mounted on a pivotal arm 46 spring biased to hold the pinch roller 45 against the drive roller. The spring force holding the pinch  
10 roller 45 against the drive 31 is arranged to be slightly greater than that holding the pinch roller 32 against the drive roller 31. The backing 47 then passes to a motor drive take-up spool mounted on the base 10 and having a hub 48 and triangular  
15 backing plate 49.

Disposed immediately below the stripper block 43 there is a downwardly inclined gate 50 comprising two spaced apart limbs 50a, 50b the upwardly inclined surface of which are formed with a series of  
20 vacuum ports connected to a source of vacuum (not shown). The upper end of the gate is disposed immediately below the corner of the stripper block 43 so that as a label is stripped from the block, the label is pushed by the backing strip passing around the corner of the block on to the upwardly inclined  
25 surface of the gate where it is held in place by the aforesaid vacuum. A triangular shaped label applying drum 51 is mounted on a spindle 52 below the lower end of the gate 50. The spindle 52 is mounted  
30 in a bearing block 52a at one end of an arm 53 pivotally mounted at 54 on the base 10. The other end of the arm is connected to the piston rod 55 of a pneumatic ram 56 mounted on the base for a purpose described below. A stepper motor is  
35 mounted coaxial with the pivot 54 of the arm 53 and a belt drive 57 extends from an output pulley of the motor to a pulley on the spindle carrying the drum 51 to rotate the drum in accordance with the movement of the motor. The drum apices are each  
40 formed with a label applying pad 58 each of which has a label holding surface 59. Each surface 59 is of generally rectangular perimeter and is formed with a cavity 60 the perimeter 61 of which is inset from the perimeter of the surface by a uniform amount  
45 around the surface so that the perimeter of the cavity is also generally rectangular. Each cavity 60 extends into the body of the respective pad 58 and communicates via a respective passageway 62 with a respective pressure port 63, the three pressure ports 63  
50 being equally spaced around the spindle axis and facing the bearing block 52a. By means of an adaptor plate 64, the passageways 62 widen out at the ports 63 to a kidney shape 64 which are about two and a half times as long around the spindle axis as they are  
55 wide radially to the spindle axis. As the drum 51 rotates, each port 63 cyclicly communicates with a port 65 in the bearing block 52a, with a port 66 in the bearing block 52a and then is blocked. The port 65 is connected to a vacuum source V, and the port 66 is  
60 connected to a change-over valve 67 which can connect the port 66 either to the vacuum source V or a supply CA of compressed air.

Each cavity 60 is substantially closed by a plate 68 mounted in the cavity with the surface of the plate  
65 flush with the surface 59 of the pad and with a

uniform width gap 69 between the perimeter of the plate and the perimeter of the cavity. The back of the plate and bottom of the cavity are so shaped that a uniform distribution of air from the passageway 62 is  
70 provided to create a skirt of air of uniform velocity around the skirt when air pressure is supplied to the cavity 60.

The rotary drum 51 is positioned so that the path of the pads 58 runs through the gate 50 between the  
75 spaced 50a, 50b thereof and the drum is anti-clockwise so that the pad 58 lifts labels from the gate 50 as the drum is driven through the gate, the pad 58 being connected to the vacuum source V by means of the respective port 63 communicating with the  
80 vacuum port 65. The drum 51 is raised by contraction of the ram 56 towards the gate when a pressure pad 58 is moving into position to collect a label from the gate. The contraction of the ram is controlled by a screw adjuster 70 on the ram which limits the  
85 contraction of the piston rod 55 into the ram so that the registration of the pick-up surface 59 in the gate can be adjusted along the gate. This enables the surface to be positioned centrally with respect to the label on the gate whatever the depth of the label.  
90 Once the pressure pad 58 has moved slight past the gate, the ram 56 is extended to drop the hub 51 downwardly to the bottom of its travel so that the extremity of the pressure pad 58 can clear the underside of the printing mechanism 12 disposed  
95 about the gate. The hub 51 then continues to rotate in an anti-clockwise direction to bring the pressure pad to a generally horizontal attitude. During this rotation, the port 63 for the pad 58 carrying the label moves into communication with the port air/vacuum  
100 port 66, the valve 67 being arranged to connect the port 66 to the vacuum source. During this transfer from port 65 to port 66, the kidney shape 65 of the port 63 enables the connection to the vacuum source V not be interrupted. The label applying apparatus is  
105 co-ordinated with the conveyor system referred to above so that when the pressure pad carrying a label arrives in the horizontal position, the article to which that label relates is disposed below the pressure pad. The valve 67 is then operated automatically to  
110 connect the port 66 to the air supply CA to create a skirt of air flow from the pad 58 which drives the label downwardly on to the article. It has been found that a skirt of air in this form creates a stable force on the label and labels can be displaced up to six inches  
115 on to an article using this system. As the pad reaches the label apply position, the port 63 for the next pad comes into communication with the vacuum port 65. Also, after the label has been applied and as the drum continues to rotate the valve 67 is returned to  
120 connect port 66 to the vacuum source V ready for the port 63 of the next pad to come into communication vacuum via the port 66.

#### CLAIMS

125 1. A labelling apparatus for applying self-adhesive labels to articles comprising a grid having a surface to receive labels, means to feed labels one after the other to the grid at one end of the grid, the  
130 grid comprising two spaced limbs each having ports

at said surface of the grid to hold a label thereon, a rotary head disposed at the opposite end of the grid to said label feeding means, the rotary head having a plurality of label holding/apparatus pads disposed  
 5 around its periphery, mounting means for the rotary head to support the head for rotation of the pads on the head through the gate to collect labels therefrom and to discharge the labels on to articles at a station spaced from the gate and means to adjust the  
 10 mounting for the rotary head in a direction generally parallel to the lengthwise direction of the gate to adjust the location at which the pads register in the gate so that the pads can be centred with respect to the labels supplied to the gate.

2. A labelling apparatus as claimed in claim 1 wherein means are provided for moving the rotary head to the limit of its travel away from the gate immediately after a pad has passed through the gate.

3. A labelling apparatus as claimed in claim 2 wherein the rotary head is mounted on a swing arm, a double acting ram is provided for moving the arm between one limit of its travel in which the head is disposed furthest from the gate and another limit of  
 25 its travel in which is disposed nearest the gate and means are provided for adjusting the latter limit of the travel of the ram.

4. A labelling apparatus as claimed in claim 3 wherein the ram has an adjustable stop for limiting  
 30 the travel of the ram in a direction to move the head towards the limit of its travel nearest the gate.

5. A labelling apparatus as claimed in claim 4 wherein the rotary head is a generally triangular cross section and three label holding/applying pads  
 35 are provided at the apexes of the head.

6. A labelling apparatus as claimed in any of the preceding claims wherein means are provided for applying vacuum and air pressure to the surface of each pad on the head and valve means are provided  
 40 for communicating vacuum to the pad at the gate to hold a label on the gate to the pad as the pad rotates through the gate and to maintain the vacuum until the pad reaches a required discharge station whereupon the vacuum is released and air pressure is  
 45 applied to the pad to press the label on to an article.

7. A labelling apparatus as claimed in any of the preceding claims wherein the means for moving the rotary head to the limit of its travel on the way from the gate is arranged to operate when a pad on the  
 50 head has just passed through the gate after collecting a label at the gate.

8. A labelling apparatus as claimed in any of the preceding claims wherein means are provided for supplying labels on a backing to the grid, means  
 55 being provided adjacent said one end of the grid for stripping the labels from the backing to deliver free labels to the grid.

9. A labelling apparatus as claimed in claim 8 wherein printing means are provided for printing  
 60 information on the labels immediately before stripping from the backing.

10. A labelling apparatus as claimed in claim 8 or claim 9 wherein common drive means are provided for feeding the label carrying backing to the label  
 65 stripping means and for drawing off the stripped

backing therefrom.

11. A labelling apparatus as claimed in claim 10 wherein the common drive means comprise a motor driven roller, a first idle roller spring biased against the motor driven roller to provide a nip through  
 70 which the label carrying backing is passed prior to the label stripping means and a second idle roller spring biased against the drive roller for locations spaced from the first idle roller to provide a second  
 75 nip through which the stripped backing is passed, the spring biasing of the second idle roller against the drive roller being greater than that of the first idle roller against the drive roller.

12. A labelling apparatus substantially as described with reference to and as illustrated in the accompanying drawings.

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